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IS 10077 (1982): equipment for determination of shrinkage factors [CED 43: Soil and Foundation Engineering]



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Indian Standard

SPECIFICATION FOR EQUIPMENT FOR
DETERMINATION OF SHRINKAGE FACTORS

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INDIAN STANDARDS INSTITUTION
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NEW DELHI 110002

Indian Standard

SPECIFICATION FOR EQUIPMENT FOR DETERMINATION OF SHRINKAGE FACTORS

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Indian Standard

SPECIFICATION FOR EQUIPMENT FOR DETERMINATION OF SHRINKAGE FACTORS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 20 January 1982, after the draft finalized by the Soil Engineering and Rock Mechanics Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 The Indian Standards Institution has already published a series of standards on methods of testing soils. It has been recognised that reliable and intercomparable test results can be obtained only with standard testing equipment capable of giving the desired level of accuracy. The Sectional Committee has, therefore, decided to bring out a series of specifications covering the requirements of equipment used for testing soils to encourage its development and manufacture in the country.

0.3 The equipment covered in this standard is used in the apparatus for determination of shrinkage factors of soils covered in IS : 2720 (Part VI)-1972*.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirement of equipments for the apparatus used for determination of shrinkage limit, shrinkage ratio, shrinkage index and volumetric shrinkage of soils.

2. DIMENSIONS

2.1 Dimensions and tolerances of different equipment shall be as detailed in Fig. 1 to 6 and in 4.6. Except where tolerances are specifically mentioned against the dimensions, all dimensions shall be taken as nominal dimensions and tolerances as given in IS : 2102-1969‡ shall apply.

*Methods of test for soils: Part VI Determination of shrinkage factors (*first revision*).

†Rules for rounding off numerical values (*revised*).

‡Allowable deviations for dimensions without specified tolerances (*first revision*).

3. MATERIALS

3.1 The materials of construction of various parts of the apparatus/equipment shall be as given in Table 1 and 4.6.

TABLE 1 MATERIALS OF CONSTRUCTION OF PARTS OF EQUIPMENTS

EQUIPMENT	MATERIAL	SPECIAL REQUIREMENT, IF ANY	RELEVANT INDIAN STANDARD SPECIFICATION
Evaporating dish	Porcelain	—	IS : 2837 (Part II) - 1977*
Spatula			
a) Blade	Steel	Polished	see IS : 2507-1975†
b) Handle	Wood	Painted	see IS : 620-1975‡
Shrinkage dish	Stainless steel		Grade 07Cr18Ni9 of IS : 6911-1972§
Prong plate			
a) Prong	i) Brass		see IS : 319-1974
	ii) Stainless steel		see Grade 07Cr18Ni9 of IS : 6911-1972§
b) Plate	Acrylic plastic**		
Plain plate	Acrylic plastic**		
Glass cup	Glass		see IS : 878-1975¶

*Specification for porcelain crucibles and basins: Part II Basins (first revision).

†Specification for cold rolled steel strip for springs (first revision).

‡General requirements for wooden tool handles (third revision).

§Specification for stainless steel plate sheet and strip.

||Specification for free-cutting brass bars, rods and sections (third revision).

¶Specification for graduated measuring cylinders (first revision).

**Relevant Indian Standard is under preparation.

4. CONSTRUCTION

4.1 Evaporating Dish — The evaporating dish shall be as detailed in Fig. 1. The inside of the evaporating dish shall be smooth.

4.2 Spatula — The spatula shall be as detailed in Fig. 2. A wooden handle shall be fixed as shown in Fig. 2.

4.3 Shrinkage Dish — The shrinkage dish shall be as detailed in Fig. 3. The internal corner between the bottom and the vertical sides shall be rounded into a smooth concave curve of approximately 3 mm radius.

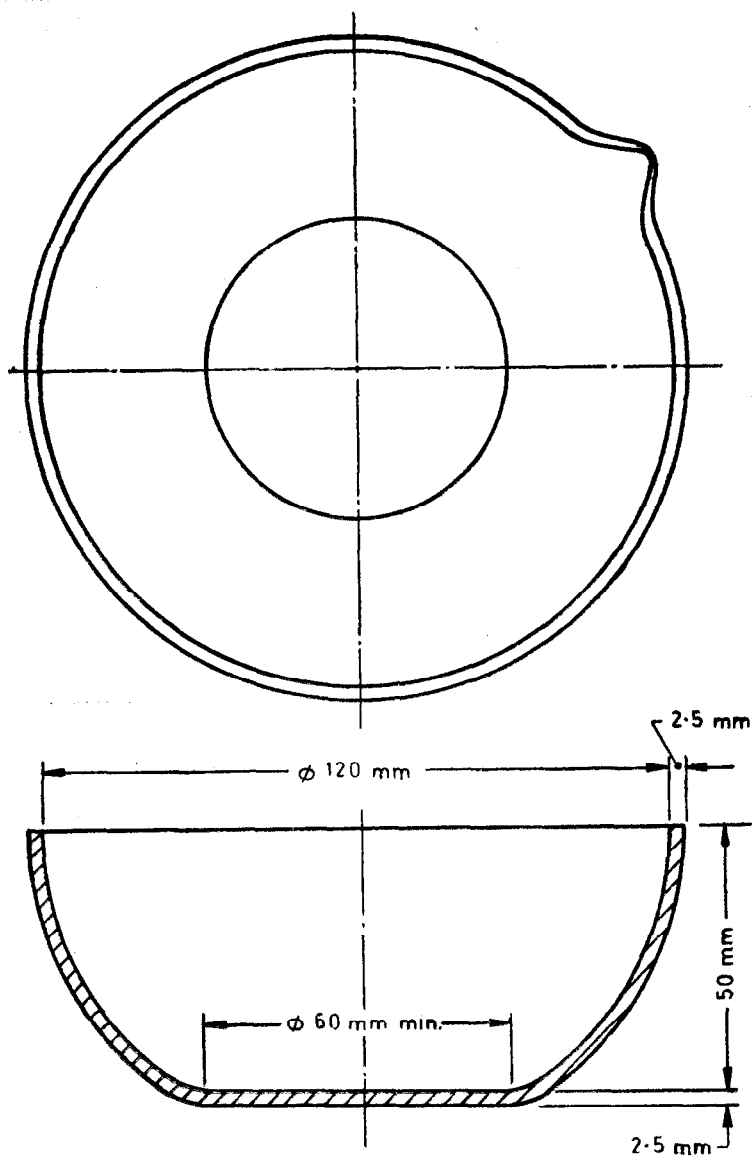
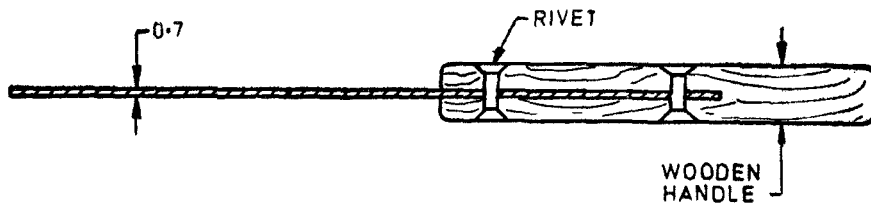
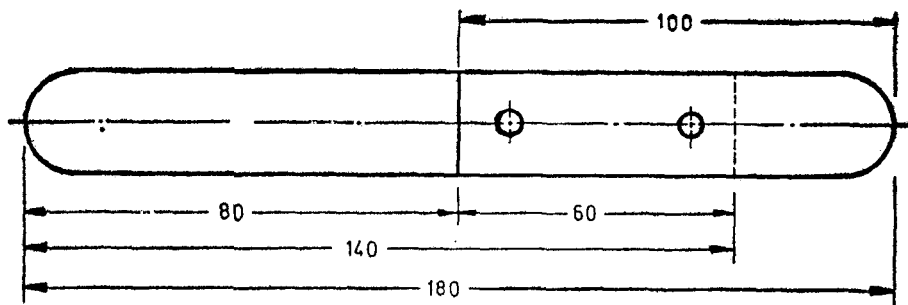
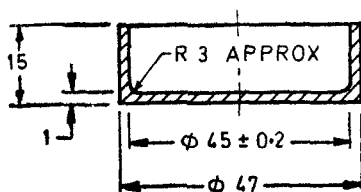


FIG. 1 EVAPORATION DISH



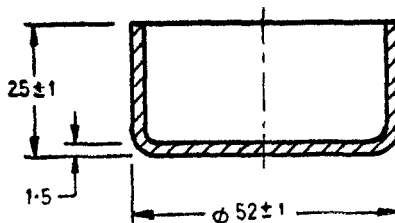
All dimensions in millimetres.

FIG. 2 SPATULA



All dimensions in millimetres.

FIG. 3 SHRINKAGE DISH



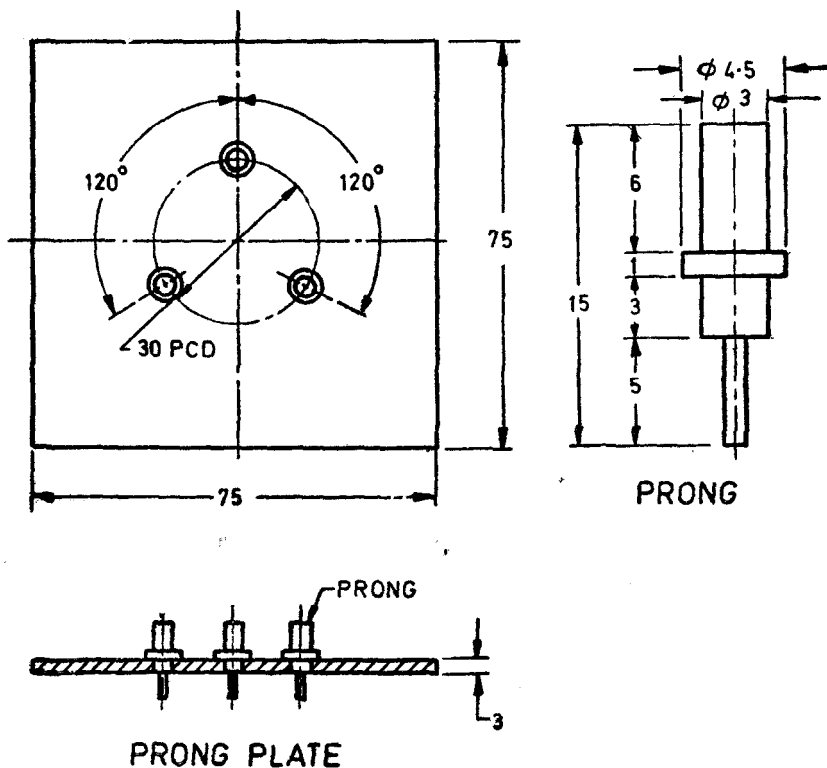
All dimensions in millimetres.

FIG. 4 GLASS CUP

4.4 Glass Cup — It shall be as detailed in Fig. 4.

4.5 Prong Plate — The prong plate shall be as detailed in Fig. 5. The plate shall be plain. Three prongs as detailed in Fig. 5 shall be fixed to the plate at 120° to each other and spacing of 30 mm (centre to centre).

4.6 Plain Plate — The plate shall be of size 75 mm square and of 3 mm thickness. The plate shall be plain (see Fig. 6).



All dimensions in millimetres.

FIG. 5 DETAILS OF PRONG

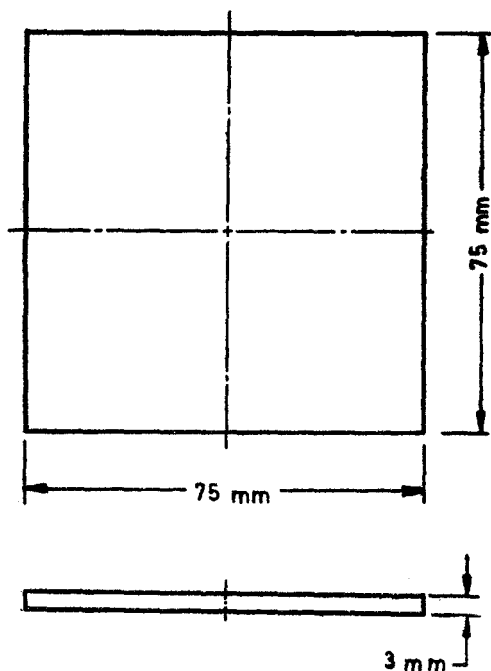
4.7 Other Accessories — The equipment shall also have the following other accessories:

- Straight Edge — 150 mm long and 25 mm wide as per IS : 2220-1962*.
- Measuring Cylinder — of 25 ml capacity as per IS : 878-1975†.

5. MARKING

*Specification for steel straight edges.

†Specification for graduated measuring cylinders (*first revision*).



All dimensions in millimetres.

FIG. 6 PLAIN PLATE

5.1 The following information shall be clearly and indelibly marked suitably:

- a) Name of manufacturer or his registered trade-mark,
- b) Date of manufacture, and
- c) Type of material used.

5.1.1 The equipment may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

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